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WEITERE INFORMATIONEN OK

An unending variety of topics

Saturday, January 22, 2011

Tech roundup 01/22/11

Atomic clock on a chip for about $1,500. Accurate and independent clocks improve secure synchronous protocols, in other words can help securely determine the order in which events occur on the Internet, wireless, and other networks while minimizing dependence on trusted third parties like GPS. The technology nicely complements secure timestamping (see e.g. here, here, and here) which can leave an unforgeable record of the ordering of events and the times at which specific data or documents existed.

Bitcoin, an implementation of the bit gold idea (and another example of where the order of events is important), continues to be popular.

It is finally being increasingly realized that there are many "squishy" areas where scientific methods don't work as well as they do in hard sciences like physics and chemistry. Including psychology, significant portions of medicine, ecology, and I'd add the social sciences, climate, and nutrition. These areas are often hopelessly infected with subjective judgments about results, so it's not too surprising that when the the collective judgments change about what constitutes, for example, the "health" of a mind, body, society, or ecosystem, that the "results" of experiments as defined in terms of these judgments change as well. See also "The Trouble With Science".

Flat sats (as I like to call them) may help expand our mobility in the decades ahead. Keith Lofstrom proposes fabricating an entire portion of a phased array communications satellite -- solar cells, radios, electronics, computation, etc. -- on a single silicon wafer. Tens of thousands or more of these, each nearly a foot wide, may be launched on a single small rocket. If they're thin enough, orientation and orbit can be maintained using light pressure (like a solar sail). Medium-term application: phased array broadcast of TV or data allows much smaller ground antennas, perhaps even satellite TV and (mostly downlink) Internet in your phone, iPad, or laptop. Long-term: lack of need for structure to hold together an array of flat sats may bring down the cost of solar power in space to the point that we can put the power-hungry server farms of Internet companies like Google, Amazon, Facebook, etc. in orbit. Biggest potential problem: large numbers of these satellites may both create and be vulnerable to micrometeors and other space debris.

Introduction to genetic programming, a powerful evolutionary machine learning technique that can invent new electronic circuits, rediscover Kepler's laws from orbital data in seconds, and much more, as long as it has fairly complete and efficient simulations of the environment it is inventing or discovering in.

Exploration for underwater gold mining is underway. See also "Mining the Vast Deep."

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About Me

Nick Szabo

"A premier thinker about history, law and economics, and the lessons they have for security." -- Adam Shostack, Emergent Chaos

"Szabo comes out with these essays that leave me in awe." -- Brian Dunbar

"Reading material that is eclectic, challenging and endlessly fascinating." -- Sean McGrath, Propylon

"Like most blogs worth my attention, this blog is updated only infrequently. That is because the authors of blogs worth my attention only post when they have something to say that is true, relevant and not already known by their audience. Most of the human race does not have the skill to know when an idea has these three properties. The skill is particularly rare in the fields of politics and economics, which is why this blog is such a rare and valuable thing." -- Richard Hollerith

View my complete profile

Posted by Nick Szabo at 1:54 PM

5 comments:

Old Farragut said...

So what is the more promising way to get new atoms. Rocket to the heavens or dig further down into the bowels of the earth?

1:42 AM

Alrenous said...

I think the scientific irregularities are better explained by publishing bias, rather than inherent epistemic issues.

So they check for significance. Only one in twenty studies will have their results by chance.

But on marginally meaningful effects, those other 19 studies will simply be filed away in a drawer...until the deviant 20th is published, and lowers the threshold by being someone to refute.

Not that I object to the judgment thing in general. It's especially fun to watch paleo diet people, who use the data in a lipid-hypothesis paper to refute the conclusions of that very paper. (For an example on an entire book: http://rawfoodsos.com/2010/07/07/the-china-study-fact-or-fallac Notably, it doesn't matter who's right.)

Deriving the correct conclusions from data is something of an art in all sciences. In physics the judgment is concentrated a bit upstream, where the system is first converted to a mathematical representation, and so they get to pretend everything downstream is 'hard.'

7:09 AM

nick said...

Old Farragut: good question. Atoms per se are cheap. We don't need more mass to solve any of the major problems we have in the developed world. Even living space is cheap in most countries. Land is nearly free in most areas of Russia, North America, and Australia -- it's just living space near the people we want to live near that is expensive.

This suggests, contrary to what our religious instincts dream about, that down is better. Partly to find more of the more useful kinds of atoms (mining the vasty deep) but mostly to open up the valuable real estate below our cities. Building ever bigger skyscrapers is good too, but I don't see anything on the horizon that is stronger yet as cheap as steel.

But few buildings are actually built to the limits of steel, so the even more important problem to solve in real estate is a political incentives problem -- people who already own real estate have a strong incentive to organize politically and gang up on developers (yes you read that correctly) to enhance the scarcity of what they own. We need cities that credibly commit, in a hard-to-amend city charter, to ditch zoning and other political control over development in favor of a strong property rights regime.

10:06 AM

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nick said...

Alrenous, I agree publishing bias (which favors positive over negative or inclusive results) is a big problem, as is the funding bias I discussed in "The Trouble With Science." But even if these biases could be eliminated, many areas that we would very much like to learn about are inherently difficult. They are not feasibly learnable via measurement or other attempts at quantification, and such attempts almost always just lend a false precision. As the mathematics of and experience with machine learning suggests, some results in or closely related to physics (e.g. Kepler's laws) are just bog-easy to discover from the data (OK, bog-easy for a 21st century computer -- it took humans thousands of years of error to get to Kepler's laws). But increase the complexity of the object of study and the learning difficulty increases exponentially.

In the complex areas -- among them nutrition, economics, politics -- we need to be giving greater weight to kinds of knowledge that have been slighted since the Manhattan Project and Sputnik raised scientists to an exalted priesthood, namely tradition: knowledge accumulated across many generations of people. In nutrition, you probably should be eating what your ancestors for the last few thousand years -- your ancestors, not somebody else's -- ate unless strongly proven otherwise. They accumulated thousands of life-long experiences eating food suited to your particular genetics -- why throw out all that hard-won knowledge for the sake of impressive sounding pseudoscience?

In academia, we need to favor traditional academic disciplines and methods of reasoning (e.g. the ones taught in law, the oldest academic discipline) and start a Darwinian process of pruning down the modern cults (e.g. "social sciences"). And the fetish with statistics as the sole arbiter of truth needs to go: we need to relearn the traditional arts of reasoning, for example the importance of making thoughtful assumptions and clearly stating them instead of hiding them, like numerologists, behind a blizzard of mathematics and jargon.

Professor Hanson loves to bash me for failing to read the various papers he thinks I must read before I'm allowed to state my thoughts on some certain matter. Reading these idiotic piles of garbage is the last thing any person concerned with discovering reality should want to do, because practically every paper he and other "social scientists" laud is (a) written in the novel terminology and mathematical shorthand of their particular academic cult, and thus impossible to read without reading a bunch of prior papers written by that cult's acolytes, and then (b) when you take this tremendous effort to decipher it, you discover that the paper, and often the entire cult, is based on idiotic assumptions so that, regardless of the impressive rigor of the mathematics, the conclusions are a complete load of crap.

Almost every paper I read in these areas is a further instance of professors lavishly demonstrating their high IQ but utterly failing to do anything useful with it. To hell with that, life is far too short to get bogged down in the pseudoscience that dominates much of academia these days. I agree with Peter Thiel, the smarter you are, the more valuable for society if you drop out of university. Do what Gates, Zuckererg, et. al. did, get great grades in high school to get into a top school (so you can prove to strangers in the future that you're smart) and then drop out. If you are pursuing novel areas come up with your own ideas. If you are pursuing areas with which humans have long experience, drink from the cup of tradition. Either way, outside the hard sciences it's usually wise to stay away from the siren songs of modern academic fads.

11:17 AM

nick said...

errata: "inclusive" should be "inconclusive" above.

11:30 AM

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